Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application.

1. (currently amended) A method for improving a thermal barrier coating comprising:

providing a substrate;

cryomilling MCrAlY ~~without the inclusion of other metallic alloys~~ to produce ~~substantially~~ a nanocrystalline metallic alloy powder substantially of MCrAlY alloy, where M is comprised of at least one of the group of Co, Ni and Fe;

thermally spraying the nanocrystalline MCrAlY onto a metallic substrate to provide a nanocrystalline bond coat consisting substantially of MCrAlY; and

providing a ceramic top coat on the nanocrystalline bond coat.

2. – 10. (cancelled)

11. (currently amended) ~~The method of claim 1~~ A method for improving a thermal barrier coating comprising:

providing a substrate;

~~where~~ cryomilling ~~MCrAlY comprises cryomilling~~ an added alumina powder with the MCrAlY to achieve nanocrystalline grain sizes by introduction of alumina particles during cryomilling to produce nanocrystalline MCrAlY, where M is comprised of at least one of the group of Co, Ni and Fe; ~~and~~

disposing the cryomilled nanostructured alumina and MCrAlY composite coating on ~~a~~ the nanocrystalline bond coat on the substrate; and

providing a ceramic top coat on the nanocrystalline bond coat.

12. (currently amended) A method for improving a thermal barrier coating comprising:

providing a substrate;

cryomilling a MCrAlY powder to achieve nanocrystalline grain sizes, where M is comprised of at least one of the group of Co, Ni and Fe;

~~The method of claim 11 where~~ disposing the cryomilled nanocrystalline MCrAlY and alumina as a composite coating on the nanocrystalline bond coat on the substrate ~~alumina powder on the bond coat~~ comprises plasma spraying the nanocrystalline MCrAlY and alumina ~~powder~~ composite coating onto the nanocrystalline bond coat in the presence of oxygen, and

providing a ceramic top coat on the nanocrystalline bond coat.

13. (currently amended) A thermal barrier coating comprising:

a substrate;

a bond coat substantially ~~composed~~ consisting of a cryomilled nanocrystalline an MCrAlY alloy system ~~without inclusion of other metallic alloys~~, where M is comprised of at least one of the group of Co, Ni and Fe, disposed onto the substrate using a high velocity oxy fuel (HVOF) thermal spray process or low pressure plasma (LPPS) spray process ~~onto the substrate~~; and

a ceramic top coat on the bond coat.

14. – 24. (cancelled)

25. (currently amended) A method for improving a MCrAlY thermal barrier coating made from MCrAlY powder, where M is a metal or metal alloy, comprising:

providing a MCrAlY bond coat on a substrate; and

providing a nanocrystalline nano-composite metallic powder coating on the MCrAlY bond coat ~~without inclusion of other metallic alloys~~ where the nanostructured nano-composite coating is prepared by refining the microstructure of a metallic alloy system consisting substantially of MCrAlY powder used to make the nanostructure nano-composite coating to nanocrystalline grain size.

26. (cancelled)

27. (currently amended) The method of claim 25 where refining the microstructure of the MCrAlY powder to nanocrystalline grain size comprises cryomilling the MCrAlY powder to nanocrystalline grain size including ~~through the~~ in-situ formation of oxides, nitrides and/or oxynitrides.

28. (currently amended) A method for improving a MCrAlY thermal barrier coating made from MCrAlY powder, where M is a metal or metal alloy, comprising:

providing a MCrAlY bond coat on a substrate; and

providing a nanocrystalline nano-composite coating on the MCrAlY bond coat where the nanostructured nano-composite coating is prepared by refining the microstructure of a MCrAlY powder and alumina used to make the nanostructure nano-composite coating to nanocrystalline grain size,

~~The method of claim 25~~ where refining the microstructure of the MCrAlY powder to nanocrystalline grain size comprises cryomilling the MCrAlY powder and refining the microstructure of the MCrAlY powder to nanocrystalline grain size during cryomilling through the introduction of Al_2O_3 particles added during cryomilling.

29. (cancelled)

30. (previously presented) The method of claim 28 where refining the microstructure of the MCrAlY powder to nanocrystalline grain size achieved after cryomilling comprises introducing nano alumina whiskers during cryomilling.

31. – 36. (cancelled)

37. (currently amended) A MCrAlY thermal barrier coating made from MCrAlY powder, where M is a metal or metal alloy, comprising:

a substrate;

a cryomilled nanocrystalline ~~MCrAlY~~ bond coat on the substrate consisting substantially of MCrAlY metallic alloy ~~without inclusion of other metallic alloys~~; and

a ceramic top coat on the nanocrystalline bond coat.

38. - 45. (cancelled)